BRIEFER ARTICLES.

Botany at the World's Fair.—There is no separate display illustrating the science of botany at the World's Columbian Exposition. What good might have resulted from an adequate setting forth of the history, development, economic importance, apparatus and methods of modern botany can only be imperfectly surmised. The opportunity to let the public, as well as their co-laborers, know what the 3,000 persons who devote their energies to this science are accomplishing has not been seized.

There is, however, considerable material scattered through the Exposition of interest to botanists. But it is so widely separated, and in the main so difficult to find, that it is likely to be largely missed by those who would receive the most benefit from the display. The following brief account may be an aid to visitors, but it is necessarily imperfect. Several days were devoted to securing the data for the article, and yet the writer has reason to believe that many interesting and praiseworthy exhibits of a botanical nature were overlooked. He is also aware that important details could have been added about those seen, and must offer as an excuse for their absence the difficulty which one meets as a rule in securing information. Very few of the exhibits are accompanied by adequate information, sometimes they are entirely unlabeled, and as a rule the attendants, if they can be found, can add little, if anything.

The largest herbarium shown is that of the Botanical Division of the U. S. Department of Agriculture. This consists of several thousand mounts arranged in a large case, illustrating the very satisfactory and complete method in use in the Division. It includes flowering plants, vascular cryptogams and lichens, and is purely a scientific exhibit, without even a single sheet with its mount exposed to attract the attention of the public. It is situated near the northeastern corner of the Government Building.

In the gallery of the Horticultural Building under the dome are a number of excellent collections. The Montana State Commission display the state flora upon two handsome oak wall counters with heavy mirror-glass backs and a wide shelf above. There are fifteen ingeniously constructed portfolios, containing over 1,000 specimens, prepared by Prof. F. D. Kelsey, who has recently removed to Oberlin, Ohio. Some material was contributed by R. S. Williams, of Great Falls, Mont. One additional portfolio of specimens was furnished by Mrs. J. E. Light, and two more by Mrs. L. A. Fitch, who also displays some herbarium specimens on the wall of the science room in the Woman's Building. Ten large frames containing bouquets of dried flowers, prepared by Emil Starz, complete the display.

The Wisconsin State Horticultural Society shows twenty portfolios of plants mounted on blotting paper, and very imperfectly named. The preparation of this collection was evidently entrusted to wholly incompetent hands.

The Kentucky exhibit is mounted on herbarium sheets and placed under glass in swinging frames, as are many of the others yet to be mentioned. It was prepared by Prof. H. Garman and Mr. J. S. Terrill, and is classified as forest trees, grasses, ferns, and wild plants. Miss Sadie Price, of Bowling Green, Ky., exhibits some 500 pencil sketches of Kentucky plants, in part admirably colored, in connection with the preceding.

The Oregon exhibit, prepared by Drake and Gorman, is a large and interesting one, particularly notable for its handsome mounting, the swinging frames being supported by massive oak standards.

Miss Nettie Palmer, of Edison Park, Ill., shows a large collection, well mounted in swinging frames.

Mrs. S. B. Walker, of Castle Rock, Colo., has an interesting collection of about 500 specimens in swinging frames, although not fully named, and also a case of gift articles decorated with pressed flowers.

The Missouri Commission shows over 1,600 specimens, collected largely by B. F. Bush. They are displayed in white frames, which do not prove as pleasing as the oak frames chosen by most exhibitors.

The next largest number of herbaria are brought together in the science rooms of the Woman's Building. In this place Alida P. Lansing shows 1,100 specimens of Colorado plants in swinging frames. A common fault of this method of display is here very marked. The central frame work is not sufficiently rigid to support the heavy load of frames without sagging, and in consequence the frames swing strongly in one direction, making it very unpleasant to examine the specimens.

The Montana flora is illustrated by over 400 specimens, collected by various women of the state, and handsomely mounted in swinging frames, supported on a massive column with carved capital.

There are a hundred large sheets of Brazilian ferns mounted in swinging frames, collected by Mrs. James Watson Webb in 1867–68.

Mrs. A. M. Croley, of Tilsonburg, Ontario, Can., shows a large collection of ferns from all parts of the world. The sheets are loosely placed in wall cases.

Good herbarium specimens of Mexican plants, but not fully named, are distributed loosely in a large wall case. Neither the name of collector nor exhibitor is given.

A collection of red sea-weeds is also shown in these rooms, but no information about them could be obtained.

In the Mexican exhibit in the west gallery of the Liberal Arts Building is a collection by F. Altamirano of the National Medical Institute. The specimens are mounted on standard herbarium paper, and arranged in genus covers. They are intended to be placed in five shelf cases imitating finely bound books, which accompany them. A few sheets are displayed loosely in the show case.

In the Agricultural Building, the Colorado pavilion contains a collection of fine large specimens of grasses in swinging frames, from the State Agricultural College.

The Minnesota pavilion has over 170 oak frames filled with herbarium sheets of grasses and forage plants, disposed about the posts and desks.

In the exhibit of Agricultural Colleges and Experiment Stations, in the south-western corner of the same building, there is a small herbarium case of about twelve pigeon-holes containing mounted specimens, also about 100 sheets of Scribner's American grasses in swinging frames, and about fifty of Halsted's American weeds placed behind glass on partition walls. This exhibit also includes a most interesting display of plant diseases, by means of dried specimens, drawings, often colored, and outline maps giving distribution, mounted upon herbarium sheets, and placed behind glass upon partition walls. Diseases of garden crops and fruits comprise 112 sheets, prepared by Prof. S. M. Tracy, diseases of cotton and carnations, twenty-eight sheets, prepared by Prof. Geo. F. Atkinson, diseases of grasses and grains, sixty-six sheets, prepared by Prof. L. H. Pammel and Prof. H. L. Bolley, and the mildews of plants, forty-seven sheets, prepared by Prof. S. M. Tracy.

In the Washington State Building 150 swinging frames ranged along the wall of the south wing display 1,200 specimens of the state flora, prepared by Louis F. Henderson. The labels for the most part give considerable information regarding the occurrence of the species, and in this respect it is one of the best herbaria shown.

The exhibit of the Michigan Agricultural College, in the Liberal Arts Building, and of the Illinois University in the Illinois State Building each contains a tall pigeon-holed case partly filled with specimens, illustrating the construction of herbarium cases and the formation of an herbarium.

In the German exhibit in the Liberal Arts Building are two volumes by Hieronymus and Pax entitled "Herbarium Cecidiologicum," being exsiccati of galls, also a volume of Paul Hennings' "Phycotheca

Marchica" bearing date of 1893, being fifty specimens of dried fresh-water algæ, and also a volume of handsome exsiccati illustrating Mr. Hennings' methods of preparing succulent flowering plants and fleshy fungi for the herbarium, which every collector and preparator should be sure to see. There is also here an interesting historical exhibit, probably the only one in the Exposition relating to botany, showing the way in which J. J. Rousseau kept his specimens. It includes a vellum-bound volume, about eight by ten inches, in which the plants are fastened with strips of gilt paper, some loose sheets of plants, a manuscript catalogue of his collection, and his list of signs used as abbreviations.

It is a significant fact that in only three places in the great Exposition does one run across the placard "Botany," one of these being at this place in the German exhibit, where some space is set apart for botany in the portion devoted to the German universities, one being in the exhibit of the Agricultural Colleges and Experiment Stations, where a botanist is constantly in attendance, and one in the University exhibit in the Illinois State Building.

The German botanical exhibit is largely from the Royal Botanical Museum of Berlin. Beside the objects already mentioned there are seven wall cases about twenty inches wide by four feet high filled with (1) the plants that ants inhabit, (2) principal German hymenopterous galls, (3) phytopterous galls, (4) dipterous galls, (5 and 6) large fungi from the German colonies in Africa, and (7) fragments from the tombs of Egypt, about 1700–1200 B. C., including wheat and barley grains, tubers of Cyperus, palm seeds, stolons of mint, and wreaths made of the leaves of Mimusops and petals of Nymphæa. The Botanical Institute of Breslau shows eleven photographic views of the grounds and some printed volumes. The Institute of Vegetable Physiology of Berlin shows colored models of the several developmental forms of Puccinia, Claviceps and Peronospora from designs by Dr. W. Zopf, and of Marchantia, pine seeds and seedlings, Primula flowers, structure of pine wood, etc., from designs by Dr. Carl Müller, all made by Brendel of Berlin. The same institution shows large microscopic sections of wood,and microscopic mounts showing the effect of light and gravity upon the growth of mycelium, prepared by Prof. L. Kny, and also a set of Kny's colored wall charts. The Botanical Museum of Kiel shows a dredge used for marine algæ by Dr. Reinke, and a published volume of his results.

It will be seen that while this is an interesting exhibit, it is not in any respect representative of the present state of botany in Germany.

On the same floor, which is a second limited gallery, reached by

stairways in the German section of the western gallery are models of Claviceps and Puccinia made by Paul Osterloh, of Leipzig, and colored wall charts with black back ground of flower dissections, published by Frommann and Morian, of Darmstadt (Fred. Buch, 1138 Milwaukee Ave., Chicago, agent).

A very large series of the Brendel models is shown by the manufacturer among the school supplies in the German section in the first gallery.

In the space devoted to botany in the exhibit of Agricultural Colleges and Experiment Stations in the Agricultural Building will be found, beside the collections already referred to, a fine set of thirty vials containing root tubercles of different species of Leguminosæ from the virgin soil of North Dakota, prepared by Prof. H. L. Bolley, a set of Halsted's weed seeds in vials, a full-sized model of the famous experiment conducted by President Clark, of the Massachusetts Agricultural College, in which a squash was made to lift a weight of 5,000 pounds as its size increased by growth, and also a model of the present vegetation house and laboratory building of that institution. There are a number of standard seed testers shown by the North Carolina experiment station, a universal stand for photographing flowers, fruits, microscopic preparations, etc., devised by Prof. F. L. Scribner, sixty-two bromide enlargements, 11 by 14 inches, from photographs by Prof. L. H. Bailey, illustrating the effects of crossing the egg-plant, tomato, corn, cabbage, cauliflower, turnip, squash, gourd, coleus, phlox, etc., and preparations by Prof. F. H. King showing the distribution in the soil of the roots of common cultivated plants.

In the same exhibit is a case devoted to physiological apparatus exhibited by J. C. Arthur, showing twenty-three pieces, a few of which are imported, and a part made from original designs. It appears to be the only display illustrating vegetable physiology in whole or in part in the Exposition.

Photographs of thirty-four American and forty-eight foreign botanists are shown at this place. A still larger number, however, are shown in the exhibit of the Michigan Agricultural College, in the Liberal Arts Building, where photographs may also be seen of the grounds and botanic garden of that institution.

Some excellent photographs, 4 by 5 inches, of plant galls and the larger fungi, are exhibited by Miss Cora H. Clark, of Jamaica Plain, Mass., in the Science Room of the Woman's Building. There are many fine bromide enlargements of views in the Botanic Garden of Sidney, New South Wales, in the gallery under the dome of the Horticultural Building, and also five views of the botanical garden of the Royal University of Tokio, in the same room.

Photographs of the laboratories and of students performing various experiments are shown in the exhibit of Purdue University in the Liberal Arts building, giving a very complete idea of the facilities of this institution for teaching botany, especially when taken in connection with the apparatus shown in one of the cases.

Harvard University in the same building shows a case of the handsome glass models of flowers from the Ware collection, which now numbers 400 species, and will eventually number 1200 species or more; also a case of fibers, handsomely mounted; 20 fine illustrations, 10 by 12 inches, very faithfully colored, from a forthcoming work on North American fleshy fungi by Prof. W. G. Farlow; and a set of the published writings of Dr. Gray.

The Illinois University has, in the State Building, the most complete exhibit to illustrate the teaching of botany to be found in the Exposition. It contains a working desk for an undergraduate student and one for an investigator, a series of microscopes formerly used and a series now in use, sets of microscopic slides, photomicrographic enlargements, apparatus for photomicrography, sets of reagents and stains, a very full bacteriological outfit with living cultures, an herbarium previously referred to, museum specimens, a set of reference books, card catalogues, and many other things that can not find place here. Across the aisle in the display made by the Experiment Station of that institution is a long case showing diseases of cultivated plants, and a collection of seeds of wild plants.

The Division of Vegetable Pathology in the Government Building makes a very creditable display of its work, showing wax models of diseased fruits and leaves, large photographs to illustrate treatment, bacteriological and microscopical apparatus, and a set of slides revolving under a microscope, which last proves a very attractive feature to the public.

The agricultural schools of France are represented in the Agricultural Building near the southwestern corner. Here one will see models of grape seeds, each about two inches long, showing twelve types of grape seeds, and plates illustrating grape diseases, shown by Prof. Viala, of the school of Montpellier; a set of twenty-four specimens illustrating plant diseases, a wall chart of fungi, and a record of important discoveries made at this school, dating from 1807 when Prevost ascertained the nature of the bunt of wheat and proposed the copper sulphate remedy, later discoveries being made by Tulasne, Duchartre, Millardet and Prillieux, the exhibit being made by Prof. Prillieux, of the National Agricultural Institute; and finally seven student's herbaria of about one hundred specimens each, from the school at Sartilly.

If one is interested in fibers, the Exposition offers many opportunities for studying them. One should especially see the exhibit of Paraguay in the Agricultural Building and of the Section of Fiber Investigation in the Government Building.

A very beautiful exhibit of skeletonized leaves and seedpods is shown by Mrs. A. M. Croley in the science room of the Woman's Building

A fine large set of fungi of more than usual interest is shown by C. H. Peck, of the New York State Museum, in the gallery under the dome of the Horticultural Building. Models of fungi rather crudely colored and fancifully arranged are shown by the division of microscopy in the Government Building.

There are numerous extensive displays of medicinal plants in jars, often accompanied by herbarium specimens, of which the best are shown in the Government Building by the Department of Agriculture, in the Agricultural Building by Paraguay, in the western gallery of the Fine Arts Building by Mexico, and in the Costa Rica building.

The Forestry Building contains much of interest to botanists. The displays made by New York, North Carolina, Ohio, and Russia should be especially examined. The last has a new device for showing herbarium specimens of trees.

There are many collections of grasses tied up in bunches. Such may be seen in the western wing of the Illinois Building, in the Division of Botany in the Government Building, and in the Wyoming and North Dakota pavilions in the Agricultural Building. The latter is especially complete as a state exhibit, containing, beside the sedges, 124 species of true grasses belonging to forty-nine genera, of which eighty-eight species are native of the state. It is well displayed in heavy oak cases.

Large and interesting displays of bacteriological apparatus are made by the German universities in the gallery of the Liberal Arts Building, the U. S. Hospital Service at the south end, and the Bureau of Animal Industry on the east side of the Government Building. The last two also maintain laboratories and show many kinds of living cultures as does also the bacteriological laboratory for milk and butter in the exhibit of Agricultural College and Experiment Stations in the Agricultural Building.

A very large number of paintings in water colors of the flora of Australia, each about eighteen by twenty-two inches, is displayed on the walls of the New South Wales Building. The artist is Mrs. Rowan, who is expected at the fair the latter part of August. The collection is a unique and beautiful one, and is for sale at a valuation of $25,000.

At the west entrance to the central pavilion of the Art Palace is a

large bas-relief in plaster of Linnæus, by Jacob Eriksson, of Stockholm. The figure is life size, and shows the father of botany leaning against a tree admiring a wild flower in his buttonhole. The pose is admirable, and the expression just what a person familiar with the character of the great naturalist will regard as best portraying his nature. In the arch above is crouching Flora with an armful of flowers. The piece is valued at $1,500. It has been secured by a Swedish gentleman of Chicago and will be presented to the Chicago Art Institute at the close of the Exposition. The sculptor is now in Paris executing the same piece in marble to be placed in the Museum of Stockholm.—J. C. A.

EDITORIAL.

ALL BOTANISTS who wish to promote the interests of this vast science in America (and who does not) must feel gratified at the outcome of the gatherings of botanists in the latter part of August at Madison. For almost two weeks daily meetings were being held with which botanists were more or less closely identified. Numerous papers of scientific importance were presented at these gatherings. Section G, the new section of botany colonized from section F, was one of the busiest of the sections. Thirty-four papers were presented before it, and only thirty-five before the long established and popular section of anthropology.

BUT OUR GRATULATION is based not so much on the number and character of these papers as upon the amount of work undertaken not for selfish ends but for the purpose of advancing the interests of botanical research and instruction, and especially upon the unanimity with which all these schemes were undertaken. This spirit of cordial coöperation is one of the most promising evidences of the good-fellowship which seems to characterize botanists more than some other scientific groups we could name. The manifestation of it at these Madison meetings has been even more marked than at Rochester last year when we commented upon it. It is to be hoped that the feeling here is only the precursor of a similar sentiment of international scope.

THE SUSTAINED INTEREST in these annual gatherings is also noticeable. Although the attendance upon the American Association as a whole fell far below expectations, the registration scarcely reaching 300, the number of botanists present was almost if not quite as great as at Rochester. It is safe to say that the number of botanists in Madison did not fall much short of one hundred.